

## Lab helps satellite keep its cool in space

*by John Brownlee, Space Vehicles Directorate*

*KIRTLAND AFB, N.M.* – When things start to really heat up, call the Air Force Research Laboratory to help cool them down again.

That's what the Department of Energy (DOE) did recently to help cool a high-tech imaging sensor inside its Multispectral Thermal Imager research satellite launched recently from Vandenberg AFB, Calif.

Researchers at AFRL's Space Vehicles Directorate led the development of a highly specialized cooling device known as a "pulse tube cryocooler," a relatively small, yet sophisticated refrigerator manufactured by the TRW Corporation that cools to very low temperatures and enables the performance of sensors such as those used by new multi-spectral imaging technology onboard DOE's satellite.

For space-based sensors to work effectively, they must function in a cold environment to contrast and accurately identify "warmer" objects in space or on the ground through their reflected and thermally radiated signatures, or spectral "fingerprints."

By alternately compressing and expanding a gas—usually helium—through heat exchangers, cryocoolers provide cryogenic refrigeration for tightly compacted electronics and enable the collection of sharper images.

Developed by DOE's Sandia and Los Alamos national laboratories, MTI uses advanced sensors that can "see" reflected light and heat from objects on the ground otherwise invisible to the eye. The experiment will evaluate advanced space-based imaging sensors for military and civilian applications such as treaty monitoring, waste heat pollution and mapping chemical spills. @